

IN THE CLAIMS

1. (Withdrawn) A crucible comprising:
a wall including a bottom wall and side wall;
an aluminum-doped layer formed on an inner portion of said wall; and
an aluminum-doped layer formed on an outer portion of said wall.
2. (Withdrawn) The crucible of claim 1, wherein the aluminum-doped outer layer is substantially an outer layer of the side wall.
3. (Withdrawn) The crucible of claim 1, wherein the inner layer is in the range of 0.2–1.2mm deep.
4. (Withdrawn) The crucible of claim 1, wherein the inner layer is doped with aluminum in the range of about 50–500ppm.
5. (Withdrawn) The crucible of claim 1, wherein the outer layer is no more than substantially 0.5–2.5 mm deep.
6. (Withdrawn) The crucible of claim 1, wherein the outer layer is doped with aluminum in the range of about 100–500ppm.
7. (Withdrawn) The crucible of claim 1, wherein a portion of the side wall interposed between the outer layer and the inner layer is free of aluminum doping.

8. (Withdrawn) The crucible of claim 1, wherein a portion of the bottom wall interposed between the outer layer and the inner layer is free of aluminum doping.

9-16. (Cancelled)

17. (Withdrawn) A silica glass crucible, comprising:
a wall including a bottom wall and a side wall;
an homogeneously aluminum-doped layer formed on the inner portion of said wall;
wherein said layer has a depth in the range of 0.2–0.5mm and is doped with aluminum in the range of about 50–500ppm.

18. (Withdrawn) The crucible of claim 17, wherein the inner layer is doped with aluminum in the range of about 80–160ppm.

19. (Withdrawn) The crucible of claim 17, wherein the inner layer is doped with aluminum in the range of about 100–120ppm.

20-27. (Cancelled)

28. (Withdrawn) A silica glass crucible comprising:
a wall including a bottom wall and a side wall; and
a layer non-homogeneously doped with aluminum formed on an inner portion of said wall to promote crystallization of silica.

29. (Withdrawn) The crucible of claim 28, wherein the inner layer has an average aluminum doping of 30–100ppm and a depth in the range of greater than 0.2mm to 1.5mm.

30. (Withdrawn) The crucible of claim 28, wherein the inner layer has a thickness of substantially 0.3–0.7mm.

31-43. (Cancelled)

44. (Currently amended). A method for making a silica glass crucible, comprising:
introducing into a rotating crucible mold outer silica grain doped with aluminum to form an outer layer;

introducing into said mold bulk silica grain consisting essentially of quartz grain to form a bulky wall including a bottom wall and a side wall;

heating the interior of the mold; and

introducing into said mold inner silica grain doped with aluminum, wherein the heat fuses said outer and bulk silica grains and at least partially melts said inner silica grain and fuses said at least partially molten inner silica grain to the bulk wall to form an inner layer having a thickness of .2mm to less than .5mm.

45. (Previously presented) The method of claim 44, further comprising cooling the fused silica grains so as to form within the inner layer a plurality of nuclei of crystalline silica.

46. (Previously presented) The method of claim 45, wherein cooling comprises maintaining the crucible in the range of 400-600°C for approximately 25 minute.

47. (Previously presented) The method of claim 45, wherein cooling comprises maintaining the crucible in the range of 1400-1600°C for approximately one minute.

48. (Previously presented) The method of claim 44, wherein the outer layer is formed substantially on the side wall.

49. Canceled.

50. (Previously presented) The method of claim 44, wherein the inner silica grain is doped with aluminum in the range of 50-500ppm.

51. (Previously presented) The method of claim 44, wherein the outer silica grain is doped with aluminum in the range of 100-500ppm.

52. (Currently amended) A method for making a silica glass crucible, comprising:
introducing into a rotating crucible mold bulk silica grain consisting essentially of pure silica grain to form a bulk grain wall having a bottom wall and a side wall;
heating the interior of the mold;
introducing into said mold inner silica grain doped with aluminum, wherein the heat fuses said bulk silica grain and at least partially melts said inner silica grain and fuses said at least partially molten inner silica grain to the bulk grain wall to form a homogeneously aluminum-doped inner layer having a depth in the range of .2mm to less than .5mm and being homogeneously doped with aluminum in the range of about 50-500ppm.

53. (Previously presented) The method of claim 52, further comprising cooling so as to form within the inner layer a plurality of nuclei of crystalline silica.

54. (Previously presented) The method of claim 53, wherein cooling comprises maintaining the crucible in the range of 400-600°C for approximately 25 minute.

55. (Previously presented) The method of claim 53, wherein cooling comprises maintaining the crucible in the range of 1400-1600°C for approximately one minute.

56. Canceled.

57. Canceled.

58. (Previously presented) The method of claim 52, wherein the inner layer is doped with aluminum in the range of about 80-160ppm.

59. (Previously presented) The method of claim 52, wherein the inner layer is doped with aluminum in the range of about 100-120ppm.

60. (Currently amended) A method for making a silica glass crucible, comprising:
introducing into a rotating crucible mold bulk silica grain to form a bulk grain wall having a bottom wall and a side wall, said bulk silica grain consisting essentially of pure silica grain;

heating the interior of the mold; and

introducing into said mold a non-homogeneous combination of ~~silica grain containing~~
aluminum coarse quartz grain coated with aluminum having at least approximately 20% of

the grains being larger than approximately 200um in grain size, wherein the heat fuses said bulk silica grain and wherein the heat at least partially melts said non-homogeneous silica grain and fuses said at least partially molten non-homogeneous silica grain to the wall to form an inner layer.

61. (Previously presented) The method of claim 60, further comprising cooling so as to form within the inner layer a plurality of nuclei of crystalline silica.

62. (Previously presented) The method of claim 61, wherein cooling comprises maintaining the crucible in the range of 400-600°C for approximately 25 minute.

63. (Previously presented) The method of claim 61, wherein cooling comprises maintaining the crucible in the range of 1400-1600°C for approximately one minute.

64. Canceled.

65. Canceled.

66. Canceled.

67. Canceled.

68. Canceled.

69. Canceled.

70. (Currently amended) The method of claim [[69]] 60, wherein at least approximately 50% of the coarse quartz grains are larger than approximately 200um in grain size.

71. (Previously presented) The method of claim 60, wherein the inner layer has a thickness of substantially 0.2–1.5mm.

72. (Previously presented) The method of claim 60, wherein the inner layer has a thickness of substantially 0.3–0.7mm.

73. (New) A method for making a silica glass crucible, comprising:
introducing into a rotating crucible mold bulk silica grain to form a bulk grain wall having a bottom wall and a side wall, said bulk silica grain consisting essentially of pure silica grain;
heating the interior of the mold; and
introducing into said mold a non-homogeneous combination of silica grain comprising a mixture of aluminum-doped silica grain and non-doped silica grain, wherein the heat fuses said bulk silica grain and wherein the heat at least partially melts said non-homogeneous silica grain and fuses said at least partially molten non-homogeneous silica grain to the wall to form an inner layer doped with less than 100 ppm aluminum.

74. (New) The method of claim 73, further comprising cooling so as to form within the inner layer a plurality of nuclei of crystalline silica.

75. (New) The method of claim 74, wherein cooling comprises maintaining the crucible in the range of 400-600°C for approximately 25 minute.

76. (New) The method of claim 74, wherein cooling comprises maintaining the crucible in the range of 1400-1600°C for approximately one minute.

78. (New) The method of claim 73, wherein the aluminum-doped silica grain is doped with at least 80ppm to approximately 160ppm aluminum.

79. (New) The method of claim 73, wherein the aluminum-doped silica grain is doped with approximately 90ppm to 110ppm aluminum.

80. (New) The method of claim 73, wherein the non-doped silica grain is natural quartz grain containing less than approximately 18ppm aluminum.

81. (New) The method of claim 73, wherein the non-doped silica grain is synthetic silica grain containing less than approximately 1ppm aluminum and less than approximately 5ppm of total metallic impurities.

82. (New) The method of claim 73, wherein the inner layer has a thickness of substantially 0.2–1.5mm.

83. (New) The method of claim 73, wherein the inner layer has a thickness of substantially 0.3–0.7mm.

84. (New) The method of claim 73, wherein the inner layer is doped with aluminum in the range of 30-100 ppm.

85. (New) The method of claim 73, wherein the inner layer is doped with aluminum in the range of 30-80 ppm.